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10/552,608

02/06/2006

Eric Lescouet

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EXAMINER

KAWSAR, ABDULLAH AL

ART UNIT

PAPER NUMBER

2195

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/552,608	<b>Applicant(s)</b> LESCOUET ET AL.
	<b>Examiner</b> ABDULLAH AL KAWSAR	<b>Art Unit</b> 2195

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 December 1010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 and 34-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32, 34-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/22/2010; 12/29/2010</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Claims 1-32, 34-36 are pending.

### **Double Patenting**

2. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

3. Claims 28-29 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 30 and 31 of copending Application No.10/573,918. This is a statutory provisional double patenting rejection since the conflicting claims have not in fact been patented.

4. Claim 28 is provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 33 of copending Application No.10/573,881. This is a statutory provisional double patenting rejection since the conflicting claims have not in fact been patented.

**Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-12, 15-22, 25-32, 34-36 are rejected under 35 U.S.C. 102(e) as being anticipated by Ohno et al.(US Patent No. 6,715, 016).

6. As per claim 1, Ohno teaches the invention as claimed including a method of enabling multiple different operating systems to run concurrently on the same computer (figure 1), comprising:

selecting a first operating system to have a high priority (col 3, lines 53-55; OS-B);

selecting at least one second operating system to have a lower priority than the first operating system (col 3, lines 39-42; lines 53-57; OS-A);

providing a common program arranged to switch between said operating systems under predetermined conditions (col 3, lines 59-65); and

modifying said first and second operating systems to allow them to be controlled by said common program (col 1, lines 64-67 through col 2, lines 1-19),

wherein the second operating system is prevented from directly responding to and masking hardware interrupts, and wherein the second operating system is adapted to respond instead to interrupts events from the common program (col 6, lines 57-67 through col 7, lines 1-

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9; interrupts are forwarded to the common program for processing and then from the common program interrupts are send to the second operating system).

7. As per claim 2, Ohno teaches in which the first operating system is a real time operating system (col 3, lines 53-55).

8. As per claim 3, Ohno teaches in which the second operating system is a non-real time, general-purpose operating system (col 3, lines 39-42).

9. As per claim 4, Ohno teaches in which the second operating system is Linux, or a version or variant thereof (col 3, lines 39-42).

10. As per claim 5, Ohno teaches in which the common program is arranged to save, and to restore from a saved version, the processor state required to switch between the operating systems (col 2, lines 4-11).

11. As per claim 6, Ohno teaches in which processor exceptions for the second operating system are handled by the common program (col 8, lines 41-45).

12. As per claim 7, Ohno teaches in which the common program is arranged to intercept some processor exceptions, and to call exception handling routines of the first operating system to service them (col 7, lines 21-41).

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13. As per claim 8, Ohno teaches in which the processor exceptions for the second operating system are notified as virtual exceptions (col 8, lines 33-49).

14. As per claim 9, Ohno teaches in which the common program is arranged to call an exception handling routine of the second operating system corresponding to a said exception which is pending (col 8, lines 33-49).

15. As per claim 10, Ohno teaches further comprising providing each of said operating systems with separate memory spaces in which each can exclusively operate (col 4, lines 65-67 through col 5, lines 1-2).

16. As per claim 11, Ohno teaches further comprising providing each of said operating systems with first input and/or output devices of said computer to which each has exclusive access (col 3, lines 24-28; col 4, lines 38-46).

17. As per claim 12, Ohno teaches in which each operating system accesses said first input and/or output devices using substantially unmodified native routines (col 4, lines 58-64).

18. As per claim 15, Ohno teaches providing a restart routine for restarting a said second operating systems without interrupting operation of said first, or said common program (col 2, lines 4-11).

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19. As per claim 16, Ohno teaches in which the common program provides trap call mechanisms, to control the operation of the second operating system, and/or event mechanisms to notify the first operating system of status changes in the second operating system (col 7, lines 55-60).

20. As per claim 17, Ohno teaches in which the common program stores a copy of the system image of the kernel of the second operating system, and is arranged to restore the kernel of the second operating system from such a saved copy (col 2, lines 4-11).

21. As per claim 18, Ohno teaches in which the first and second operating systems have cooperating routines to enable the first operating system to monitor the continued operation of the second operating system, to allow the detection of a crash of the second operating system (col 2, lines 12-19; col 3, lines 10-14).

22. As per claim 19, Ohno teaches providing a debug routine, in which the common program is arranged to output the states of machine state variables on occurrence of predefined conditions in the operation of said operating systems (col 7, lines 20-67 through col 8, lines 1-19).

23. As per claim 20, Ohno teaches combining said operating systems and common program into a single code product (col 1, lines 64-67 through col 2, lines 1-4).

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24. As per claim 21, Ohno teaches embedding said operating systems and common program onto persistent memory on a computer product (col 2, lines 20-23).

25. As per claim 22, Ohno teaches in which the common program is arranged to provide an inter-operating system communications mechanism allowing communications between said first and second operating systems, and/or applications running on them (col 3, lines 59-61).

26. As per claim 25, Ohno teaches a development kit computer program product comprising code for performing the steps of claim 1 (col 2, lines 20-23).

27. As per claim 26, Ohno teaches a computer program product comprising code combined according to claim 20 (col 1, lines 64-67 through col 2, lines 1-4).

28. As per claim 27, Ohno teaches an embedded computer system comprising a CPU, memory devices and input/output devices, having stored on persistent memory therein programs embedded according to claim 24 (col 2, lines 57-65).

29. As per claim 28, Ohno teaches the invention as claimed including a computer system comprising a CPU, memory devices and input/output devices (col 2, lines 57-65; figure 1), having executing thereon computer code comprising:

a first operating system having a relatively high priority (col 3, lines 53-55);

a second operating system having a relatively lower priority (col 3, lines 39-42; lines 53-57); and

a common program arranged to run said operating systems concurrently by switching between said operating systems under predetermined conditions (col 3, lines 59-65).

30. As per claim 29, Ohno teaches a computer system according to claim 28, arranged to run said first and second operating systems concurrently (col 3, lines 39-52).

31. As per claim 30, Ohno teaches in which each said operating system is provided with an idle routine, in which it passes control to the common program (col 3, lines 59-67 through col 4, lines 1-14).

32. As per claim 31, Ohno teaches in which said idle routine substitutes for a processor halt instruction (col 3, lines 59-67 through col 4, lines 1-14).

33. As per claim 32, Ohno teaches in which, on occurrence of processor exception during execution of an executing operating system, (a) the common program is arranged to call exception handling routines of the first operating system to service them (col 7, lines 29-41);

(b) if the exception was intended for a predetermined second operating system, a pending exception is created (col 7, lines 29-41; col 8, lines 40-49);

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(c) after the processor exception has been serviced by the first operating system, the common program is arranged to return to execution of the executing operating system (col 3, lines 47-52);

(d) when the common program next switches to the predetermined second operating system, the virtual exception which is pending is notified to the predetermined second operating system (col 7, lines 55-60; col 8, lines 41-49); and

an exception handling routine of the predetermined second operating system corresponding to the said pending exception is called to service it (col 8, lines 41-49).

34. As per claim 34, Ohno teaches in which all hardware interrupts are initially handled by the first operating system, and those intended for a second operating system are virtualised and deferred until that second operating system is next scheduled by the common program, and are serviced by that second operating system at that time (col 7, lines 29-41).

35. As per claim 35, Ohno teaches in which the common program is arranged to provide a means for the or each secondary operating system to mask virtual exceptions to replace the hardware interrupt masking code in the secondary operating system to make the secondary system fully preemptable by the primary system (col 7, lines 21-41).

36. As per claim 36, Ohno teaches in which said exception when presented to the second operating system is not masked (col 8, lines 55-65).

**Claim Rejections - 35 USC § 103**

37. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

38. Claims 13-14 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohno et al.(US Patent No. 6,715, 016), in view of Endo et al.(US Patent No. 6,615,303).

39. As per claim 13, Ohno do not specifically disclose providing each of said operating systems with access to second input and/or output devices of said computer to which each has shared access (figure 11, element 192).

However Endo teaches providing each of said operating systems with access to second input and/or output devices of said computer to which each has shared access (figure 11, element 192).

40. It would have been obvious to a person of ordinary skill in art at the time of invention was made to incorporate the teaching of Ohno into the method of Endo to have each operating system having access to input/output devices that has shared access. The modification would have been obvious because one of the ordinary skills of the art would be motivated to utilize the teaching of Endo to have devices with shared access with multiple operating system to be able utilize all the functions of the hardware device.

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41. As per claim 14, Endo teaches in which all operating systems access said second input and/or output devices using the routines of the first operating system (col 12, lines 63-67).

42. As per claim 23, Endo teaches in which the common program defines virtual input and/or output devices corresponding to communications bus bridges, so that said operating systems can communicate as if by a communications bus (figure 19; col 17, lines 55-67 through col 18, lines 1-3).

43. As per claim 24, Endo teaches in which the step of modifying said operating systems comprises adding driver routines managing said virtual bus bridge devices (figure 19; figure 19; col 17, lines 55-67 through col 18, lines 1-3).

### **Response to Arguments**

44. Applicant's arguments filed 12/22/2011 have been fully considered but they are not persuasive.

45. In remarks applicant argues:

(1) In remarks page 20 applicant argues "Claim 33 as amended is directed to the feature that the second (low priority) operating system (OS) is modified to prevent it from masking interrupts. The purpose of this feature is described in the specification at the first paragraph on page 18. The second OS is modified to remove masking of hardware

interrupts that is always preemptable by the first (high priority) OS.” is not taught by Ohno.

46. Examiner respectfully disagrees with the applicant:

i. As to point (1), applicant's argument is not persuasive as the claim language is broad and does recite any limitation about removing any interrupt controlling feature from the operating system. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., remove masking or hardware interrupt) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Ohno teaches having a common program for interrupt processing routine for servicing interrupts. The interrupts routine within the common program receives interrupts and sends the interrupts to the operating system (col 6, lines 57-67 through col 7, lines 1-9) and prevents the operating system from servicing any interrupts directly.

### **Conclusion**

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABDULLAH AL KAWSAR whose telephone number is (571)270-3169. The examiner can normally be reached on Monday to Thursday between 8:00am to 6:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng Ai T. An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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